ENGINEERING SERVICES

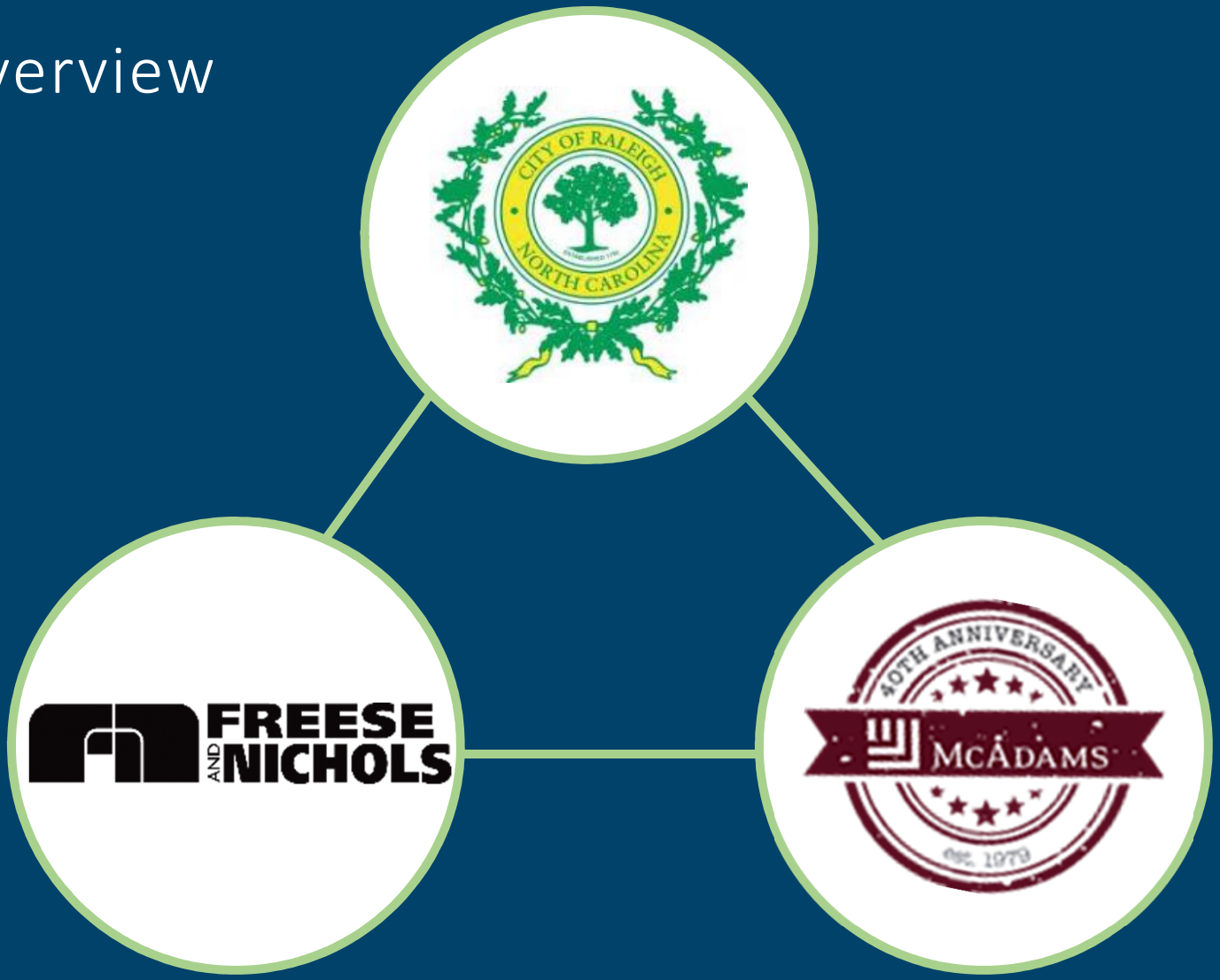
City of Raleigh Stormwater Manual Rewrite

Stakeholder Meeting

September 18, 2019

Raleigh

Team Overview



We Need Your Help

- **Current Manual was written in 2002**
- **New Regulations Need to Be Added**
  - Riparian Buffers
  - Floodplain Development
  - Small Lot Development
  - Water Supply Watersheds
  - Updated Design Standards
- **Ways to Provide Feedback**
  - Part 1
    - Survey
    - https://publicinput.com/stormwaterdesign
  - Part 2
    - Review the Draft Manual

What is a Stormwater Manual

EXISTING MANUAL Overview

- Chapter 1 – General Information
- Chapter 2 – Hydrology and Hydraulics
- Chapter 3 – Stormwater Quality Management
- Chapter 4 – Appendices

PROPOSED MANUAL Overview

- Chapter 1 – Introduction
- Chapter 2 – Site Development
- Chapter 3 – Hydrology
- Chapter 4 – Stormwater Drainage (Hydraulics)
- Chapter 5 – Stormwater Management (Quality)
- Chapter 6 – Sediment & Erosion
- Chapter 7 – Floodplain Management
- Chapter 8 – Fee Credits

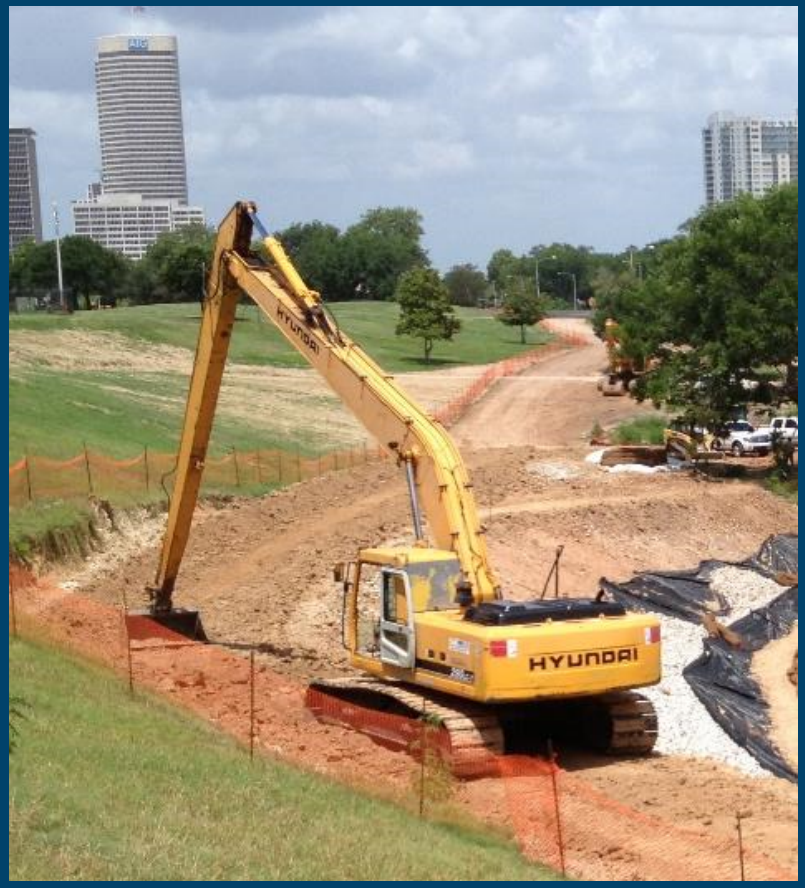
Chapter 1. Introduction

- **Purpose of the Manual**
- **References to Checklists**
- **Comprehensive List of Regulations**
  - Floodplain
  - 401/404
  - State Buffer
  - State Dam Safety
  - Etc.
- **Definitions**

Chapter 2. Site Development

- **Stormwater Development Analysis (SDA)**
  Required for:
  - Changes in drainage pattern
  - Increase in impervious area

- **Designer's Letter**
  - Examples of Applicability
    - Amended site plans (no changes in drainage)
    - Development of an approved outparcel that still meets current regulations



Chapter 2. Site Development

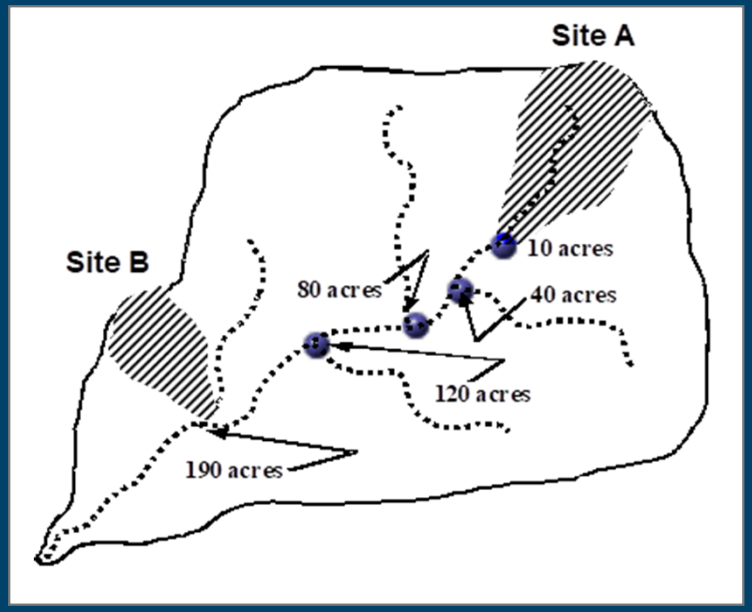
- **SDA Requirements**
  - Project Data
  - Brief Site History
  - Project Description
  - Quantifying Land Disturbance and Change in Impervious Surface
  - Streams
  - Floodplains
  - Methodology
  - Flood Study
  - Conclusions

- **Reference Material**

Chapter 2. Site Development

When is a Downstream Assessment Required

- New Residential Development
- New Commercial / Industrial Development
- Residential / Commercial / Industrial Redevelopment



Why is a Downstream Assessment Required

- Protection Downstream Properties from Flooding
- Prevent Erosion

Chapter 2. Site Development

- **Small Site Development**
  - SDA is required
  - Requires a downstream assessment
  - Listed out specific tools that may help with development

Small Site SCMs

- Disconnected Impervious
- Treatment Swales
- Green Roofs
- Infiltration Systems
- Permeable Pavement Systems
- Rainwater Harvesting
- Soakage Trench
- Planter Boxes
- Level Spreader / Vegetated Filter Strips

Chapter 2. Site Development

- **Lot Grading Requirements**
  - Lot Grading Plan – Required
  - No flooding or impounding water against a structure in the 100-yr (1%) flood
  - Offset concentrated flow from property line by 10 ft
  - Maintain existing flow patterns or provide an easement (Single Lot)
  - Concentrated flow must be intercepted by a swale (Multi-Lot)
  - All slopes 3(H):1(V)

Chapter 3. Hydrology

- **Hydrologic Methods**
  - Modified Rational Method
- **Acceptable Programs**
  - HEC-1 and HEC-2 removed

Description	Design Storm
Storm system pipes (subdivision streets)	10 year
Ditch systems	10 year
Culverts/Cross-drain (arterial streets)	25 year
Culverts/Cross-drain (thoroughfare roads)	50 year
Culverts (over regulated floodways)	100 year
Culverts/Cross-drain (primary access streets)	No overtopping in 100 year

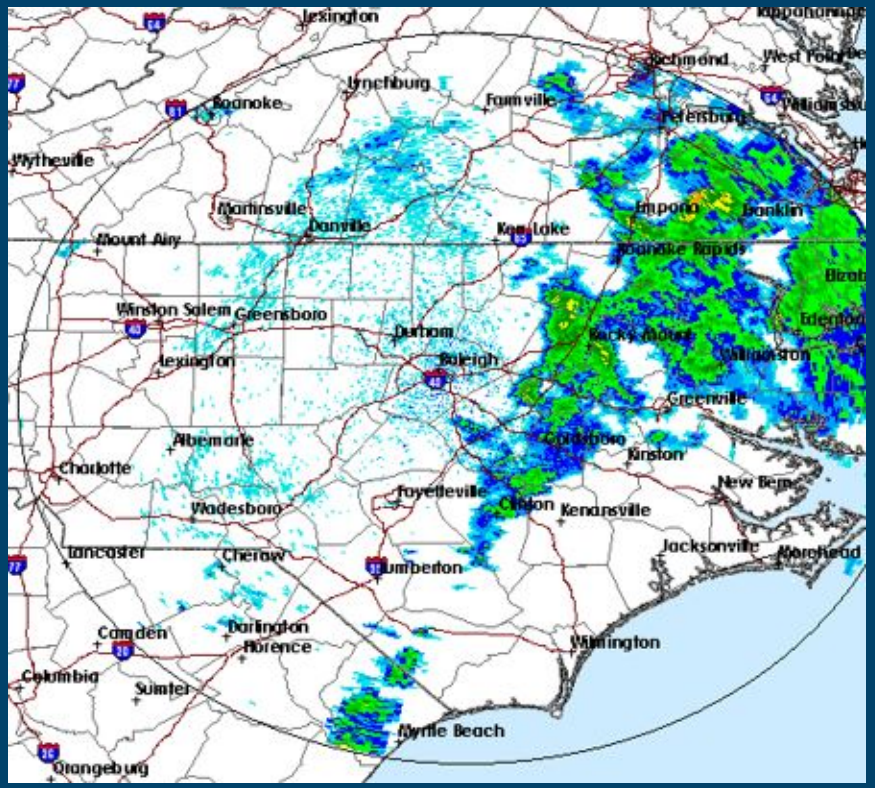
Chapter 3. Hydrology

- **Rational Method**
  - Changed equation to $Q=C_fCiA$

Frequency Factors for Rational Formula

Recurrence Interval (years)	C_f
10 or less	1.0
25	1.1
50	1.2
100	1.25

- **NOAA Atlas 14**
  - City working on updated IDF Curves

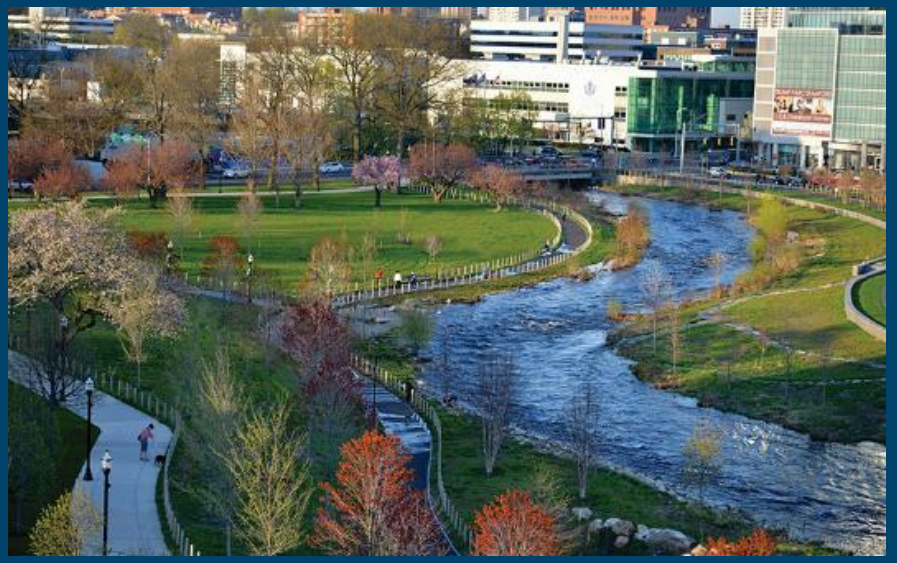


Chapter 4. Stormwater Drainage

- **Gutter Spread**
  - Spread and inlet sizing will be based on rainfall for the design storm
  - Use pipe design inlet rainfall intensity instead of 4” / hour intensity
- **Include 10-yr and 25-yr HGL on plans**

Chapter 5. Stormwater Management

- **Water Quality Considerations**
  - Water Quality Volume - 1” rainfall
  - Erosion Protection – 1-yr 24-hr storm
  - Conveyance Protection – 10-yr 24-hr storm
  - Flood Protection – 100-yr 24-hr storm
  - NC DEQ MDC
    - Additional Design Requirements above MDCs



Chapter 6. Sediment & Erosion Control

- **Consolidates information mentioned in other references**
  - Unified Development Ordinance (UDO)
  - Guidelines for Land Disturbing Activities (GLDA)
  - Expanded on Construction Phasing & Sequencing
  - Clarification on Ground Cover vs. Stabilization

Chapter 7. Floodplain Management

- **Standards and Regulations**
  - Floodplain Development
    - Separate stakeholder outreach process
  - Parking Lot Elevation Requirements
  - Flood Study Requirements and Guidance
  - Pre-Submittal Meeting for Flood Study

Chapter 8. Fee Credit

- Existing Fee Credit Manual is separate
- SMAC recommendations have been added
  - Fee credits available for installing stormwater facilities above City standards
  - Requires application, maintenance of facility, documentation and annual reporting for continued receipt of credit
  - Incorporated crediting framework from SMAC committee recommendations
  - Credits available for non-residential and SFR properties

Project Outreach

- **Input from various groups**
  - Development Community Stakeholder Group
  - Stormwater Management Advisory Council (SMAC)
  - Citizen Public Meeting
  - Developer Public Meeting
  - SMAC
  - City Council / Planning and Zoning
- **All comments and responses will be documented online**

Next Steps

- **Survey available for 30 days (closes October 16)**
- **November, draft manual will post on City of Raleigh's website and have a 30 day comment period**
- **Comments, Responses will be discussed at SMAC, Council and Planning Public Meetings**

Questions or Comments?